



John R. Kasich, Governor  
Mary Taylor, Lt. Governor  
Craig W. Butler, Director

March 13, 2017

Ms. Tinka Hyde, Director  
Great Lakes National Program Office  
USEPA Region 5 (G-9J)  
77 West Jackson Blvd.  
Chicago, Illinois 60604-3507

Dear Ms. Hyde:

Enclosed please find a proposal for the "Remedial Design for the Management of Gorge Dam Contaminated Sediments." Through the capital appropriation process, the Ohio General Assembly provided \$750,000 in state funding to assist with the Gorge Dam removal; at a 65/35 ratio, this could result in a total potential project of \$2.14 million. Removal of the Gorge Dam is perhaps the most critical contaminated sediment and habitat restoration project in the Cuyahoga River and is expected to yield significant water quality and habitat improvements.

Working closely with our local Cuyahoga Area of Concern (AOC) partners and stakeholders, we are prioritizing projects and nearing the establishment of a final list of management actions needed to delist the Cuyahoga AOC. We expect the final list of management actions to be completed and vetted by the Cuyahoga AOC Advisory Committee and Ohio EPA by July 1, 2017. At the top of any such list will be the removal of the Gorge Dam and remediation of contaminated sediments contained behind the structure.

Recent state and local collaborations successfully raised federal, state and local funds to remove the Route 82 Dam located downstream from the Gorge Dam. This dam is scheduled to be removed during calendar years 2017 and 2018. Other previous collaborations successfully decommissioned and removed several dams in the cities of Munroe Falls, Kent and Cuyahoga Falls on the Cuyahoga River. The water quality and habitat improvements resulting from these projects have been profound.

We appreciate your consideration for this phase of the project and look forward to working closely with your office. Should you have questions or require additional information please do not hesitate to contact me at (614) 644-2001.

Sincerely,

A handwritten signature in black ink, appearing to read "Tiffani", followed by a long, sweeping horizontal line.

Tiffani Kavalec, Chief  
Division of Surface Water

Enclosure

cc: Russ Gibson, Surface Water Improvement Section Manager

**Proposal to USEPA GLNPO Legacy Act Program for  
Remedial Design for the Gorge Dam Management of  
Contaminated Sediments**

**Akron and Cuyahoga Falls, Ohio**

**Cuyahoga River Area of Concern**

**Submitted by**

**Ohio Environmental Protection Agency**

**March 2017**

## **Project Management Information**

### **Ohio Environmental Protection Agency**

Russ Gibson  
Surface Water Improvement Section Manager  
Ohio EPA – DSW  
Lazarus Government Center  
50 W. Town St., Suite 700  
P.O. Box 1049  
Columbus, Ohio 43216-1049  
(614) 644-2020 (phone)  
(614) 644-2745 (fax)  
[russell.gibson@epa.ohio.gov](mailto:russell.gibson@epa.ohio.gov)

Bill Zawiski  
Water Quality Group Supervisor  
Ohio EPA - DSW  
Northeast District Office  
2110 East Aurora Road  
Twinsburg, Ohio 44087

(330) 963-1134 (phone)  
(330) 487-0769 (fax)  
[bill.zawiski@epa.ohio.gov](mailto:bill.zawiski@epa.ohio.gov)

### **Project Partners**

Summit Metro Parks  
975 Treaty Line Road  
Akron, Ohio 44313-5837

First Energy  
341 White Pond Drive  
Akron, Ohio 44320

City of Akron  
Akron Waterways Renewed!  
166 South High Street  
Akron, Ohio 44308

City of Cuyahoga Falls  
2310 Second Street  
Cuyahoga Falls, OH 44221

## Table of Contents

Project Title .....	3
Overview .....	3
Description and Objectives .....	3
Background .....	4
Proposal Objectives .....	5
Justification .....	6
Approaches and Methods .....	6
Regulatory Requirements .....	7
Stakeholder Involvement .....	7
Timeline .....	8
Budget .....	8
Area of Concern Documentation .....	13
References .....	14
<b>Figures</b>	
Figure 1. Gorge Dam .....	4
Figure 2. Great Falls of the Cuyahoga .....	6
Figure 3. Location Map .....	13
<b>Tables</b>	
Table 1. Phase 2 Budget .....	8
Table 2. Sediment Management Project Budget .....	9
Table 3. Dam Removal Project Budget .....	11



## **Project Title**

### **Remedial Design and Project Implementation for the Removal of the Gorge Dam and Management of Contaminated Sediments**

## **Overview**

This proposal is the first of what will likely be several requests for federal Great Lakes Legacy Act (GLLA) assistance to remove the Gorge Dam at the upper boundary of the Cuyahoga Area of Concern. For purposes of future planning the narrative includes information related to the design and full project implementation.

Ohio EPA anticipates that full implementation of the removal of the Gorge Dam will require at least four distinct phases. Phase 1 is a project feasibility and cost study that was completed by Tetra Tech under contract to Division of Surface Water at Ohio EPA. The feasibility study was funded through Ohio's FY10 Lake Erie Capacity Grant and enables Ohio to move forward to initiate the completion of Phase 2 of this project. It was completed in September of 2015.

**Phase 2, the subject of this request, calls for the completion of the Project Engineering Design and Environmental Report. It is anticipated that the completion of Phase 2 will cost \$1.3 million. Through the capital appropriation process, the Ohio General Assembly provided \$750,000 in state funding to assist with the Gorge Dam Removal, at a 65/35 ratio this could result in a total potential project of \$2.14 million.**

Full implementation of the project, removal of the Gorge Dam, relocation and appropriate disposal of sediments behind the dam and restoration of the riparian zone, floodplain and natural channel conditions within the exposed dam pool will occur under Phases 3 and 4. Total costs for Phase 3, which will consist of construction engineering and sediment remediation are estimated to range up to \$57.4 million. Upon completion of Phase 2 design and planning activities, Ohio EPA would move forward to request direct funding assistance for Phase 3 Implementation activities under the GLLA Program administered by USEPA-GLNPO. Phase 4 would consist of habitat restoration within this section of the Cuyahoga River to be accomplished primarily by dam removal. Total cost of Phase 4 is estimated to be \$12.5 million.

## **Description and Objectives**

The Ohio Environmental Protection Agency (OEPA), Summit Metro Parks, FirstEnergy Corporation, City of Akron, City of Cuyahoga Falls, and local river advocacy groups are requesting Great Lakes Legacy Act (GLLA) Support for a project focused on sediment remediation and habitat restoration. Removal of the Gorge Dam on the Cuyahoga River and management of accumulated sediment in the dam pool are the primary avenues to implement this project. The lower 46.5 miles of the Cuyahoga River mainstem (which includes the dam and its upstream pool) is identified as within the Cuyahoga River Area of Concern, this includes river tributaries as well as several smaller direct Lake Erie tributaries. The U.S. EPA approved TMDL for the Lower Cuyahoga River (Ohio EPA, 2003) recommends evaluating all dams in the TMDL area for removal. Completing this project is also critical for success in addressing Beneficial Use Impairments (BUIs) related to Degradation of Fish Populations, Degradation of Benthos, and Loss of Fish Habitat (Cuyahoga RAP, 2015).

## Background

The Gorge Dam is located between the cities of Akron and Cuyahoga Falls at the upper boundary of the Cuyahoga River AOC. The dam was originally constructed for hydroelectric power in 1911 by FirstEnergy's predecessor Northern Ohio Traction and Light (University of Akron, 2010). The Ohio Department of Natural Resources lists the dam as 57 feet tall and 450 feet long. Power generated from the facility was quickly shown to be inadequate and the company (now Ohio Edison) built a coal-fired power plant at the location utilizing the impoundment behind the dam for cooling water. In 1929, the company granted most of the property it owned in the gorge to the Metro Parks serving Summit County, which has maintained the property as the highly-visited Gorge Metropolitan Park. An archeological report on the Gorge Metro Park was prepared and is included as Attachment A. The region has many unique aspects in addition to the water quality resource of the Cuyahoga River. FirstEnergy (Ohio Edison) shut down hydroelectric generation at the dam in 1958; however, rights were retained to generate electricity at the facility. In the spring of 2009, the power generating station was razed.

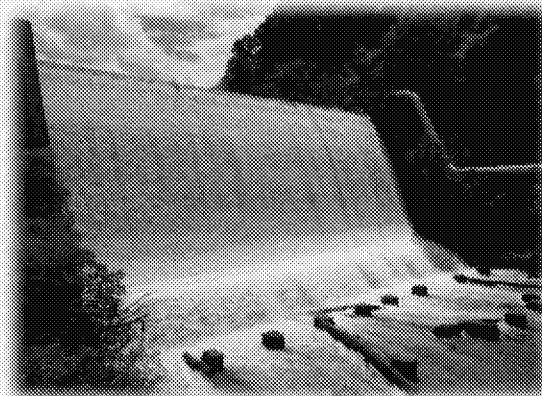


Figure 1. Gorge Dam

Dam removal for river restoration has been used as part of the Middle Cuyahoga River TMDL implementation. Removals have been monitored by Ohio EPA and documented to result in improvements to fish communities, macroinvertebrate communities, and habitat (Ohio EPA, 2008, Tuckerman et. al. 2007). The physical and ecological recovery times following a removal can vary based on a variety of local factors including recruitment populations, stream flow conditions, newly exposed habitat, and slope for example.

Sediment accumulated in the dam pool will be removed prior to restoration of a free-flowing condition. Analysis of the sediment was completed by Battelle for the US EPA (Battelle, 2012) and is included as Appendix B. The study was conducted in two phases with the first phase completed in 2009 and the second phase completed in 2011. The study conclusions noted:

*Based on evaluation of the sediment chemistry data compared to the MacDonald et al., 2000 PEC sediment quality criteria, three contaminants, cadmium, lead, and Total PAH, are of primary concern within the study area. These 3 contaminants exceeded their PEC values in >50% of the samples. There are no notable hot spots either horizontally or vertically within study area sediments. Statistical data summaries determined that, in general, contaminant concentrations were lower in the bend of the river by the Front Street bridge.*

Sediment analysis for PAH's in the 2012 study was conducted for individual compounds and total PAH compounds either as a total of 16 priority compounds (PPAH) or as a total of 34 priority compounds (t-PAH). PAH's were found in all but one sample of the 225 samples collected and analyzed for PAH's. The median result for PPAH was 12280 µg/kg, the mean was 17372 µg/kg, and the maximum was 64850. The results for the t-PAH analyses was a median of 31725 µg/kg, a mean of 34276 µg/kg, and a maximum of 150900 µg/kg. Complete results are in the 2012 report previously mentioned.

Sediment analysis for metals was also conducted on 225 samples. Cadmium and lead had results which showed levels above the PEC values in 74% and 75% of the samples respectively. Phase 1 metals results were further evaluated to predict potential toxicity using the following methodology (as included in the 2012 Batelle report):

*The results of AVS/SEM for Phase 1 were evaluated to predict the potential toxicity of metals in sediment. The results from the data evaluation in which the AVS/SEM difference is normalized by the fraction of organic carbon in the sediment are summarized in Table 3-4. The evaluation, based on U.S. EPA-developed guidance (U.S. EPA, 2005), is used to estimate bioavailability and toxicity of metals in sediments using equilibrium partitioning sediment benchmarks (ESBs). The ESB evaluation provides a quantitative method for evaluating the binding capacity of AVS and organic carbon relative to the sum of the simultaneously extracted metal ( $\Sigma$ SEM) concentrations for six metals (cadmium, copper, lead, nickel, silver, and zinc). If  $\Sigma$ SEM-AVS/foc < 130  $\mu$ moles/goc, then these metals are fully bound and not bioavailable to benthic organisms and toxicity is not likely. If  $\Sigma$ SEM-AVS/foc is between 130 and 3,000  $\mu$ moles/g, then these metals are not fully bound and they are bioavailable to benthic organisms and toxicity is uncertain. If  $\Sigma$ SEM-AVS/foc > 3,000  $\mu$ moles/goc, then these metals are not fully bound and are bioavailable to benthic organisms and toxicity is likely.*

*Data results, summarized in Table 3-4, show that the concentrations of AVS and TOC were sufficient to sequester these metals at  $\Sigma$ SEM-AVS/foc values well below 130  $\mu$ moles/goc; in fact, all values were negative with the exception of one measurement. This relationship indicates that toxicity associated with metals concentrations in sediments is unlikely. While there was not complete spatial coverage in Phase 1, data were adequately consistent horizontally and vertically to determine that AVS/SEM data were not necessary to collect for Phase 2 samples.*

The sediment is not classified as a material needing additional management actions as either hazardous waste or TSCA waste. Management can be achieved through placement within a dedicated site designed to contain the material and prevent runoff. Sediment volume within the pool was estimated to be 832,000 yd<sup>3</sup>.

A study was completed under contract for Ohio EPA (Tetra Tech, 2015) which identified several project options and their associated costs. The **Feasibility Study for the Removal of the Gorge Dam** identified dredging and downstream sediment management as the preferred option at an estimated cost of \$57,000,000, and removal of the dam with recycling of the dam debris at an estimated cost of \$12,554,000. The Study is included as Attachment C.

### **Proposal Objectives**

The objectives for this **Phase 2** proposal include addressing the following:

1. Project Engineering Design and Environmental Report preparation for implementation within the project area. Major work elements are the preparation of plans and technical specifications for the removal and management of sediment and associated dewatering liquids (including preparation of a Permit-to-Install, if needed) at the site including site preparation plans, sediment removal and dredged material management plans, site management and control plans during implementation, project quality assurance and control, site restoration plans, and a cost analysis of the project and



habitat restoration plans, if necessary as they relate to the management of sediment. The Environmental Report would also include preparation of a HER-RAS analysis for the project area which includes both upstream and downstream sections deemed appropriate for analysis. The Environmental Report would also include a geotechnical report for protection of sensitive environmental areas and ensuring the project will not negatively impact geologic stability within the gorge area. In addition, any necessary property access agreements with adjacent land owners will be obtained during the **Phase 2** in preparation of the actual sediment management (Phase 3). At the commencement of the **Phase 2**, a work plan will be prepared outlining work schedules and deliverables of the design report, quality assurance plan, bid specifications, and permitting support documents. The **Phase 2** process may include involvement of remediation contractors in discussions on design and implementability at the appropriate time.

2. Identify Regulatory requirements. Coordination with federal, state and local governments will be implemented to fulfill regulatory requirements and secure permits for sediment management, disposal and future construction activities. Regulatory coordination will be initiated in **Phase 2**.
3. Project Coordination is needed with the Summit Metro Parks, City of Akron, FirstEnergy, City of Cuyahoga Falls, and other adjoining land owners to select access sites and work with any affected landowners to secure access agreements for project implementation. The City of Akron and Summit Metro Parks will assist with securing site access. A public meeting will be held to announce the Engineering Design and Environmental Report at its completion.

### Justification

The Gorge Dam and its pool contains significant volumes of impaired sediment that contribute directly or indirectly to BUIs within the Cuyahoga River AOC, including, Degradation of Fish Populations, Degradation of Benthos, and Loss of Fish Habitat. The structure has also been identified as a source of impairment in Ohio EPA's Integrated Report. With removal of the dam, its pool, and sediment the Cuyahoga River will also be enhanced leading to economic benefits and unique recreational opportunities. Restoration of the Great Falls of the Cuyahoga will provide benefits well beyond those directly associated with water quality. This section of stream has a vertical grade change of over 220 feet within a few miles in this section of stream allowing for both passive and active recreational opportunities. This project would continue the tremendous improvements of both habitat and aquatic life within the lower section of the Cuyahoga River. BUI removal and delisting of the Cuyahoga River AOC will not be realized if contaminated sediments and dam are allowed to remain.

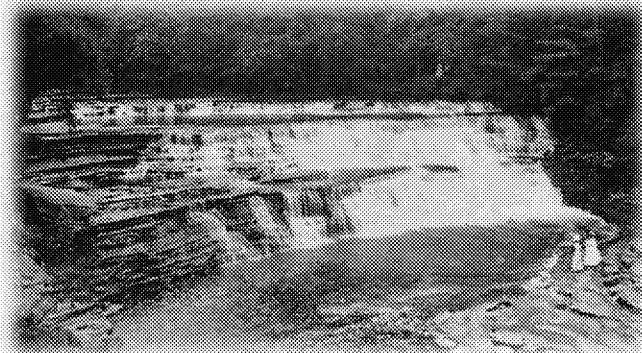


Figure 2. Great Falls of the Cuyahoga

### Approaches and Methods

#### Project Design (PD)

The Ohio EPA and its local partners are seeking GLLA Assistance for this important work within the Gorge Dam project area and Cuyahoga River AOC, some key tasks include:

- Develop a sediment management and removal plan.
- Present for public review and comment the project, at a public meeting.
- Consultation with remediation contractors for implementability review to finalize design.
- Prepare plans and specification for bidding documents.
- Prepare remedial implementation schedule.
- Obtaining local, state, and federal permits and approvals necessary to implement the project.
- Obtaining access agreements.
- Develop a dam removal and debris management plan.
- Consultation with remediation contractors for implementability review to finalize design.
- Prepare plans and specification for bidding documents.
- Prepare remedial implementation schedule.
- Obtaining local, state, and federal permits and approvals necessary to implement the project.
- Obtaining access agreements.

**Specific to the Phase 2 component of this larger project, key tasks will include: preparation of the *Project Engineering Design and Environmental Report* and public interaction (Summit Metro Parks is taking the lead on this). The report is anticipated to contain components including several of the key tasks listed above focused specifically on the contaminated sediment portion of this overall Cuyahoga River restoration project.**

### **Regulatory Requirements**

The project design will ensure that all requirements for complying with environmental regulations for this project will be followed, and any necessary permits obtained. Permits required for this project will likely include Ohio EPA and Army Corps of Engineers permits for dredging and any discharge of fill material; municipal and private landowner right of entry agreements; permits for disposal of sediment; variances from any City ordinances related to work hours or noise, air quality permits for construction or operation, Ohio NPDES wastewater discharge permits, and state, municipal and county storm water and erosion control permits. Coordination with the state historic preservation office will also be needed. As part of the permitting process, state and federal regulations may require an environmental assessment evaluation or environmental assessment for dredging projects. In addition, public notice and meeting requirements are anticipated for all aspects of permitting including public meeting or hearings for disposal of waste and potential wastewater discharge permits. Reviews for endangered resources and archaeological resources may also be required including coordination with the state historic preservation office.

### **Stakeholder Involvement**

The Ohio Environmental Protection Agency (OEPA), Summit Metro Parks, First Energy Corporation, City of Akron, City of Cuyahoga Falls, and local river advocacy groups have been working cooperatively for many years on this project. One dedicated group, Friends of the Gorge, led by local citizen Gary Whidden has been instrumental in leading tours of the Gorge and promoting the restoration of this resource through dam removal. The Summit County Metro Parks has taken the lead with the Gorge Dam stakeholders committee and is organizing committee meetings in order to be a liaison between the project and stakeholder partners.



Ohio EPA has continued to meet with potential project partners during the last decade. Currently we have received letters of support from: Cuyahoga River AOC, Summit Metro Parks, Cuyahoga Valley National Park, Conservancy for the Cuyahoga Valley National Park, Northeast Ohio Four County Regional Planning and Development Organization (designated 208 agency), Summit Soil and Water Conservation District. We have also received resolutions of support from the City of Akron, the City of Cuyahoga Falls, and the Summit County Council. In addition, letters of support have been received from the Ohio & Erie Canalway Coalition, Friends of the Crooked River, and American Whitewater. Over the years, numerous public presentations have been given on this project and other dam removals in the Cuyahoga River by both Ohio EPA and the Friends of the Crooked River.

### Timeline

The anticipated time required for completing **Phase 2**, the Project Engineering Design and Environmental Report, is approximately 15-16 months from the date of signing of the project agreement and obtaining the services of a contract consulting firm. This process may occur parallel with other project components as it will be needed to proceed with the actual removal. The Tetra Tech report indicated that the entire project including sediment and could be completed within 40 months after establishment of a Project Agreement with GLNPO, actual project implementation will be dependent on USEPA GLNPO scheduling.

### Budget

This specific request is for **Phase 2, Gorge Dam Management of Contaminated Sediments – the Project Engineering Design and Environmental Report**, and is anticipated to have a total project cost of 1.309 million dollars.

Project budgets for sediment management are included in Table 2 and project budgets for dam removal are included in Table 3. The total project cost estimated in these tables is \$69,954,000. It is anticipated that the 35% local match contribution will be approximately \$24,483,900 based on total project costs. Discussions are underway with project partners to determine local match cash or in kind contributions. It is anticipated that the actual budget and non-Federal party contributions will be established once details of the project agreement is signed between USEPA and the non-federal sponsors. The State of Ohio has included \$750,000 in its 2017 capital budget for the dam removal project. It is anticipated that use of land for disposal of the dredge material has a value in excess of \$16,000,000 if only tipping fees are considered, greater when other land use values are included.

**Table 1. Phase 2 Budget**

Task	Cost (estimated)
Community Involvement and Outreach	\$10,000 (in-kind)
Data Evaluation	\$30,000
Design	\$1,009,000
Treatability Study	\$200,000
Preparation of bid package for Phase 3	\$70,000
Access Agreements	\$20,000 (in-kind)
<b>Total</b>	<b>\$1,339,000</b>

Table 2. Sediment Management Project Budget

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1					
2					
3					
4	At Upper Pool Area				
5	Erosion Control Allowance for Equipment Access	1	LS	\$20,000.00	\$20,000
6	Mobilization/Demobilization of 12" Hydraulic Dredge; Job Trailer At Upper Pool, Temp. Power, etc.	1	LS	\$500,000.00	\$500,000
7	Hydraulic Discharge Line, 12" With 1 Booster Pump	14,300	LF	\$8.74	\$125,000
8					
9	Operations At Upper Pool Area				
10	Dredging, 12" hydr dredge; 7 Days/Week @ 16+ Hrs/Day W/Crew, & Support, 2,750 to 3,200 CY/Day Rate; Includes 1 Unmanned Booster Pump	270	DAY	\$45,000.00	\$12,150,000
11	Disposal of Non-Sediment Waste Materials To Landfill, Allowance	1	LS	\$40,000.00	\$40,000
12	Polymer for Hydraulic Dredging	800,000	CY	\$5.50	\$4,400,000
13	Polymer Feed Equipment, Chem Feed Operators, 10 MO	800,000	CY	\$2.60	\$2,060,000
14					
15					
16	At Cascade Landfill Site				
17	Mobilization/Demobilization of Earth Moving, and Other Equipment Required for Bags Deployment	1	LS	\$300,000.00	\$300,000
18	Install/Remove Temporary Perimeter Security Fence W/Gates	6,000	LF	\$24.00	\$144,000
19	Initial Erosion Control Allowance	1	LS	\$30,000.00	\$30,000
20	Clear & Grub Site	35	AC	\$9,000.00	\$315,000
21					
22	Construct Perimeter Berm & Basin Around Disposal Area				
23	Imported Soil For Perimeter Berm & Future Bag Cover, Placed	97,200	CY	\$20.00	\$1,944,000
24	Construct Berm 15' High, 10' Wide Top, 3:2 Sideslope x 5400 LF	97,200	CY	\$7.50	\$729,000
25	Construct Shallow Collection/Sedimentation Basin Alongside Berm To Collect Runoff, 5400 LF (3± MG), (In Addn To Imported Perimeter Berm Material)	16,200	CY	\$6.50	\$105,300

26	Imported Clean Granular Fill for Leveling & Liner Bedding, 12" Avg Depth Over 30 AC	48,400	CY	\$20.00	\$968,000
27	Grading of Fill Over Cascade Site	48,400	CY	\$2.50	\$121,000
28	HDPE Liner, Assume Geotextile Bags Over 26 Acres	125,840	SY	\$8.00	\$1,006,720
29	Non-Woven Geotextile Cushion Above Stone Layer, Furnish & Inst	125,840	SY	\$1.75	\$220,220
30	Washed Drain Stone Over HDPE Liner, 6" Layer In Place	31,460	TON	\$24.00	\$755,040
31	Drain Tile Underdrain Above Liner, 350' Lengths @ 20' O.C. Placed Under Bags Above Liner and Cushion Fabric	38,500	LF	\$5.50	\$211,750
32					
33	Geotextile Bags, Delivered & Installed 90' to 120' Circumference x 200'+/-	1	LS	\$4,400,000.00	\$4,400,000
34	Install/Layout of Geotextile Bags, Assume 325 @ 200' Each	325	EA	\$1,000.00	\$325,000
35	Equipment for Filling Bags	1	LS	\$50,000.00	\$50,000
36	Crew For Filling Bags During Dredging	1	LS	\$1,300,000.00	\$1,300,000
37					
38	Discharge of Bag Runoff				
39	Temporary Pumping of Runoff From Basin to Temporary WWTP; Temp Pump Station	1	LS	\$150,000.00	\$150,000
40	for SS Removal Only (Est. 1.24 Billion Gal Total Flow); WWTP Plant Only	1	LS	\$3,500,000	\$3,500,000
41	Operation and Maintenance of Temporary WWTP at Disposal Site	800,000	CY	\$10	\$8,000,000
42					
43	Manifold & Distribution Piping For Filling Bags				
44	Piping Connection - Pump Line(s) To Manifold	1	LS	\$15,000.00	\$15,000
45	Main Header To Feed Distribution Piping, 18"	2,400	LF	\$40.00	\$96,000
46	Piping Fittings, Tees & Connectors	140	EA	\$85.00	\$11,900
47	8" Feed Lines @ 350 LF; Assume 35 Each	12,300	LF	\$22.00	\$270,600
48	Valves, 1 Per 8" Feed Line; 4 Avg For Bag Fill Lines	175	EA	\$175.00	\$30,625
49					
50	Post-Dredging Work at Disposal Site				
51	Grade Out & Cover Bags Using Perimeter Berm Material	113,400	CY	\$5.50	\$623,700
52	Restore Graded Material Over Geotextile Bags, Seed & Mulch	35	AC	\$9,680.00	\$338,800
53	Temporary Erosion Control Measures Allowance	1	LS	\$40,000.00	\$40,000
54	Permanent Erosion Control Measures at Disposal Site Allowance	1	LS	\$100,000.00	\$100,000
55					
56	Disposal Site Office Allowance				
57	Job Trailer With Utility Drops at Disposal Site	12	MO	\$6,000.00	\$72,000
61					
62	Subtotal Construction				\$45,488,600
63					
64	Construction Contingency @ 15%				\$6,830,100
65	Total Estimated Construction Cost				\$52,319,000



67	Allowance For Disposal Site	1	LS	\$400,000.00	\$400,000
68	Geotechnical/Environmental Report	1	LS	\$909,772	\$909,700
69	Project Engineering Design Allowance	1	LS	\$3,411,649	\$3,411,600
70	Project Construction Engineering Allowance	1	LS	\$300,000	\$300,000
71	River Monitoring Program	1	LS	\$60,000	\$60,000
72	Security Webcams/Public Access Allowance				
73					
					\$57,400,000

Table 3. Dam Removal Project Budget

ITEM NO.	DESCRIPTION	QUANT.	UNIT	UNIT AMOUNT	TOTAL AMOUNT
1	Mobilize Equipment, Job Trailer, Service Drop, Etc. To Jobsite Following Sediment Removal	1	LS	\$400,000.00	\$400,000.00
2	Install Erosion Control for Office/Barge Launch Area, Allowance	1	LS	\$10,000.00	\$10,000
3	Lower Pool Using Existing Dam Drainline(s)	1	LS	\$2,000.00	\$2,000
4	Mobilize Barge With Hydraulic Excavator and Concrete Breakers for Dam Notching and Begin Dam Concrete Demolition	1	LS	\$500,000.00	\$500,000
5	As Material is Demolished, a Wider Work Area Will Be Created On Top of the Structure. Move Concrete Demolition Equipment to the Top of the Dam and Continue Demolition.	1	EA	\$2,500.00	\$2,500
6	Provide Erosion Control for South Haul Road Area, Allowance	1	LS	\$20,000.00	\$20,000
7	Construct Temporary Haul Road Along the South Shore Within the Former Pond Footprint. Temporary Haul Road to Run Generally from Dam Easterly and Would Ramp Up to Front Street, Crushed Concrete/Aggregate Road Approximately 2800' x 24'	6,300	TON	\$25.00	\$157,500
8	Construct Temporary Cofferdam in Riverbed to Divert River Flow to North Half of Riverbed While South Half of Dam is Removed.	7,050	TON	\$25.00	\$176,250
9	Continue With Demolition Of South Half of Dam. Demolish and Remove Remaining South Shore Foundations and Entire Foundation	13,000	CY	\$275.00	\$3,575,000
10	Remove Existing Wooden Deck Structure From Downstream of Dam On South Shore.	1	LS	\$15,000.00	\$15,000
11	Provide Erosion Control for North Haul Road Area, Allowance	1	LS	\$20,000.00	\$20,000
12	When South Half of Dam Has Been Completely Removed, Construct Temporary Haul Road Using Salvaged Aggregate From South Haul Road Along North Shore. Temporary Haul Road to Run from Dam to the East and Would Ramp Up Near Front Street, Crushed Concrete/Aggregate Road	6,625	TON	\$9.00	\$59,625
13	Remove Temporary Cofferdam Used To Divert Flow To North From Riverbed	7,050	TON	\$17.00	\$119,850
14	Continue With Demolition Of North Half of Dam, Working Generally From Top of Structure. Rubble Falls To Bottom of Structure Along Both Edges. Remove Rubble Using Highway Trucks As Demolition Progresses.	13,000	CY	\$275.00	\$3,575,000
15	Trucking Out Demolition Material to Commercial Concrete Crusher/Recycler, Loading & Trucking. No Offsite Work With Demolition Material Beyond Delivery to Recycler.	26,000	CY	\$13.00	\$338,000
16	Disposal of Non-Concrete Debris to Landfill Using Roll-off Dumpsters (Allowance)	1	LS	\$30,000.00	\$30,000
17	Removal and Disposal of Temporary Haul Road Material	6,625	CY	\$15.50	\$102,888
18	Demobilize from Worksite	1	LS	\$100,000.00	\$100,000
19	Restoration of All Disturbed Areas Including Streambed	1	LS	\$75,000.00	\$75,000
20					
22	Subtotal Construction				\$9,278,000
23					
24	Construction Contingency @ 15%				\$1,392,000
25	Total Estimated Construction Cost				\$10,670,000

28	Project Engineering Design Allowance				\$654,000
29	Project Construction Phase Engineering Allowance				\$800,000
30	Monitoring Program				\$300,000
31	Security Webcams/Public Access Allowance				\$90,000
32					
Total Estimated Project Cost					\$12,554,000



## Area of Concern Documentation

The project area lies within the Cuyahoga River Area of Concern.

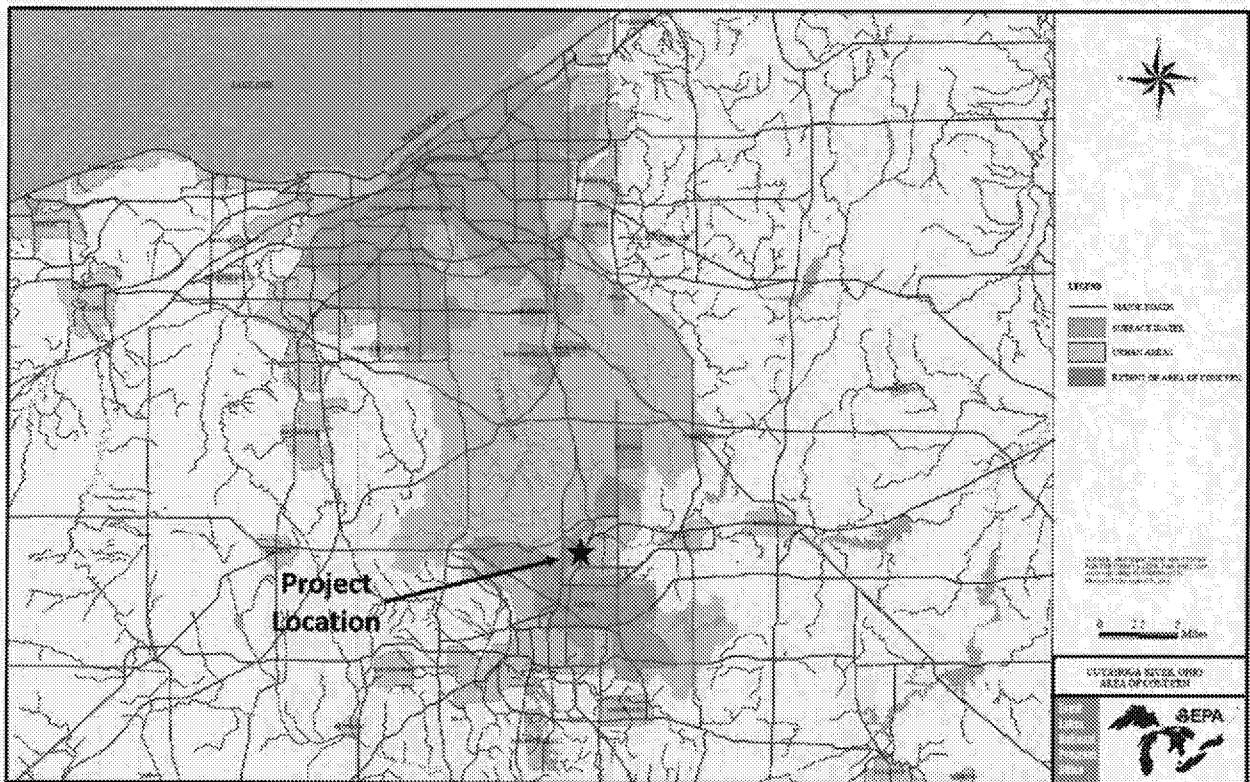


Figure 3. Location Map

## References

Battelle. June 2012. *TASK 2: Final Phase 1 and 2 Summary Report for Determination of the Nature and Extent of Potential Contaminant Concentrations in Sediments Within the Cuyahoga River Project Area*. Submitted to U.S. EPA under Contract No. EP-W-09-024. 71 p. + Appendices

Cuyahoga River Restoration. August 2015. *Stage 2 Delisting Implementation Plan Update and Progress Report (Draft)*. 157 p. + Appendices

L. Whitman, Metzger, L., Bobel, P. October 2010. *Report on the Historic Research and Archaeological Investigation of Gorge Metro Park, Cities of Cuyahoga Falls and Akron, Summit County, Ohio*. The University of Akron Community Archaeology Program, Department of Anthropology and Classical Studies. Metro Parks Serving Summit County. 139 p.

Ohio Environmental Protection Agency, Division of Surface Water. September 2003. *Total Maximum Daily Loads for the Lower Cuyahoga River, Final Report*. 102 p. + Appendices

Ohio Environmental Protection Agency, Division of Surface Water. September 2008. *Cuyahoga River Aquatic Life Use Attainment Following the Kent and Munroe Falls Dam Modifications, Portage and Summit Counties*. Ohio EPA Biological and Water Quality Report NEDO/2008-08-01. 82 p.

Tetra Tech. September 2015. *Feasibility Study for the Removal of the Gorge Dam*. Submitted to Ohio EPA under Contract. 57 p. + Appendices

Tuckerman, S., and Zawiski, B., 2007, *Case studies of dam removal and TMDLs: Process and results*. Journal of Great Lakes Research, v. 33, Special Issue 2, p. 103–116.